

1. When an oceanic plate collides with a continental plate, it sinks into the mantle below.
2. As the oceanic plate sinks, fluid is squeezed out of it.
3. The fluid flows up into the mantle rock above and changes its chemistry, causing it to melt. This forms magma (molten rock).
4. The magma rises and collects in chambers within the crust.
5. As magma fills the chamber, pressure grows. If the pressure gets high enough, the magma can break through the crust and spew out in a volcanic eruption. Most explosive volcanoes occur above subduction zones.

Why Are Some Volcanoes So Explosive?

“Mt. Pelée was incredibly explosive. It’s like twisting off the top of a soda bottle!”



JIM WEBSTER, volcanologist
Photo Credit: AMNH

It’s all a matter of chemistry. The way a volcano erupts depends on the amount of gas and silica (a molecule of silicon oxygen) in the magma below. Magma with lots of silica is thick and gooey, while magma low in silica is thin and runny. And in magma with lots of gas, bubbles form as it rises. The more bubbles that form, the more explosive the eruption!

Mt. Pelée was the most explosive type of volcano: it was high in silica and high in gas. This type of volcano is called a stratovolcano.

Explore How Different Shapes of Volcanoes Have Different Kinds of Eruptions



The most explosive eruptions come from stratovolcanoes, like the Augustine Volcano in Alaska. When they erupt, stratovolcanoes blow huge columns of gas and ash into the air that can collapse in hot, fast-moving clouds called pyroclastic flows.

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A lava dome, like the one of Chaitén Volcano in Chile, forms when thick lava oozes from a vent, piles up, and cools into a steep mound. The lava is thick because it's high in silica, and it oozes instead of explodes because it's low in gas. Sometimes lava domes form after explosive eruptions.

Photo Credit: © USGS



A shield volcano, like Mauna Kea in Hawaii, has gentle slopes formed by oozing, runny lava. The magma is low in silica and low in gas, so it doesn't erupt explosively.

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A cinder cone volcano, like Tavorvur in Papua New Guinea, forms when erupted fragments harden and fall to the ground, accumulating around the vent in a cone shape. The lava is low in silica, so the lava is runny. High gas levels make for the explosive eruptions that send lava flying. Cinder cones typically form at the beginning of eruptions, and lava flow follows.

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